



Details			
Campus		Date	
Name of student		Class	CBSE 10
Name of examination	Pre-Board 1 Examination	Student Roll No.	
Subject	Mathematics		
Session	2020-21		
Duration	3 hours		
Maximum marks	80		

### GENERAL INSTRUCTIONS

1. For students of Classes 1 - 4, use 2B or HB lead pencil.  
For students of Classes 5 and above, write in dark blue or black pen.
2. Please check that this question paper contains 11 printed pages.
3. Please check that this question paper contains 36 questions.
4. The number of marks is given in brackets at the end of each question or part question.
5. Please write down the serial number of the question before attempting.
6. Do not use paper clips, highlighters, glue, or correction fluid.
7. At the end of the examination, fasten all your work securely together.



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### EXAM-SPECIFIC INSTRUCTIONS

1. This question paper contains two parts A and B.
2. Both Part A and Part B have internal choices.

#### **Part - A**

1. It consists two sections- I and II.
2. Section I has 16 questions of 1 mark each. Internal choice is provided in 5 questions.
3. Section II has 4 questions on case study. Each case study has 5 case-based sub-parts. An examinee is to attempt any 4 out of 5 sub-parts.

#### **Part - B**

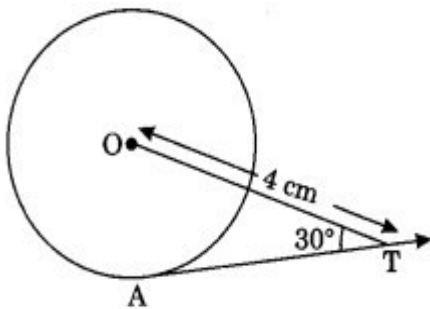
1. Question No 21 to 26 are Very short answer Type questions of 2 mark each,
2. Question No 27 to 33 are Short Answer Type questions of 3 marks each
3. Question No 34 to 36 are Long Answer Type questions of 5 marks each.
4. Internal choice is provided in 2 questions of 2 marks, 2 questions of 3 marks and 1 question of 5 marks.

[Turn over



Sr. No.	Part – A	Marks
	<p><b>Section – I</b></p> <p>Section I has 16 questions of 1 mark each. Internal choice is provided in 5 questions.</p>	
1	<p>If the product of the zeros of the quadratic polynomial <math>3x^2 + 5x + k</math> is <math>\frac{-2}{3}</math> then find k</p> <p>(OR)</p> <p>If <math>\alpha</math> and <math>\beta</math> are the zeros of <math>p(x) = x^2 - 5x + b</math> and <math>\alpha - \beta = 1</math> then find the value of b</p>	1
2	<p>If <math>x = 0.\bar{7}</math>, then find the value of <math>2x</math> as a rational number.</p>	1
3	<p>Find the value of k for which the system of equations <math>3x + 5y = 0</math> and <math>kx + 10y = 0</math> has a non - zero solution.</p>	1
4	<p>Compute the sum of the first 30 terms of the AP 3, 8, 13, 18,.....</p> <p>(OR)</p> <p>In an AP if <math>a = -2.5</math>, <math>d = 0</math>, <math>n = 107</math> then find <math>a_n</math>.</p>	1
5	<p>If the angle of elevation of the tower from a distance of 100 m from its foot is <math>60^\circ</math>, then find the height of tower.</p>	1
6	<p>Find the H.C.F and L.C.M of <math>a^2b^3c^9</math> and <math>b^2c^5d^3</math> where a, b, c, d are prime numbers.</p>	1
7	<p><math>\Delta ABC</math> is an Equilateral triangle of side <math>2a</math>. Find the length of one of its altitude</p>	1
8	<p>Write the discriminant of : <math>4\sqrt{3}x^2 + 5x - 2\sqrt{3}</math></p> <p>(OR)</p> <p>The equation <math>2x^2 + kx + 3 = 0</math> has two equal roots. Find the value of k.</p>	1



9	A car has two wipers do not overlap. Each wiper has a blade of length 21 cm sweeping through an angle of $115^\circ$ . Find the total area cleaned at each sweep of the blades.	1
10	Find the sum of first hundred even natural numbers divisible by 5. (OR) How many 2 digits numbers are divisible by 3	1
11	If $HCF(a,b) = 12$ and $a \times b = 1800$ , then find the L.C.M (a,b) (OR) Check whether $(15)^n$ can end with digit 0 for any n.	1
12	If one of the zeroes of the quadratic polynomial $f(x) = 14x^2 - 42k^2x - 9$ is negative of the other, find the value of k.	1
13	If the perimeter of a semicircular protractor is 36 cm, find its diameter.	1
14	If $\sec\theta \cdot \sin\theta = 0$ , then find the value of $\theta$ .	1
15	Find the perpendicular distance A(5,12) from the y – axis.	1
16	<p>In Fig., AT is a tangent to the circle with centre O such that <math>OT = 4</math> cm and <math>\angle OTA = 30^\circ</math>. Find the length of AT.</p> 	1



Sr. No.	Section – II	Marks
	Case study-based questions are compulsory.  Attempt any 4 sub parts from each question. Each sub parts carries 1 mark.	
17	A and B are playing cards with complete deck of 52 cards. Out of 25 games A won 13 games. Later they started playing Ludo with 2 dice.	
	(i) Find the probability of B winning cards  a) 1                      (b) $\frac{12}{25}$ (c) $\frac{25}{13}$ (d) – 1	1
	(ii) Find the probability of getting face cards.  (a) $\frac{14}{52}$ (b) $\frac{4}{25}$ (c) $\frac{38}{53}$ (d) $\frac{12}{52}$	1
	(iii) Find the probability of getting doublets.  (a) $\frac{1}{6}$ (b) $\frac{4}{36}$ (c) $\frac{6}{35}$ (d) $\frac{12}{35}$	1
	(iv) Find the probability of getting sum as even if two dice are thrown.  (a) $\frac{14}{52}$ (b) $\frac{18}{36}$ (c) $\frac{38}{53}$ (d) $\frac{12}{52}$	1
	(v) Find the probability of getting queen in red set  (a) $\frac{3}{26}$ (b) $\frac{4}{26}$ (c) $\frac{2}{26}$ (d) $\frac{2}{52}$	1

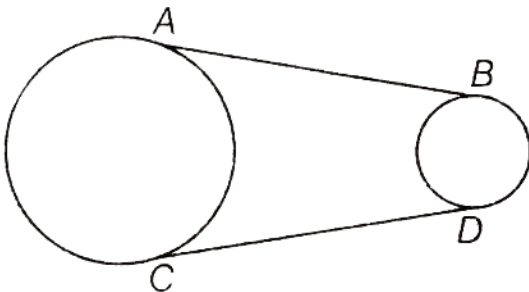


18	<p>The following table shows the marks obtained by 50 students in a class.</p> <table><tr><td>Marks</td><td>0-10</td><td>10-20</td><td>20-30</td><td>30-40</td><td>40-50</td></tr><tr><td>No of students</td><td>8</td><td>12</td><td>10</td><td>11</td><td>9</td></tr></table>	Marks	0-10	10-20	20-30	30-40	40-50	No of students	8	12	10	11	9	
Marks	0-10	10-20	20-30	30-40	40-50									
No of students	8	12	10	11	9									
	<p>(i) The class average is:</p> <p>a) 25.9            (b) 26            (c) 29            (d) 25.2</p>	1												
	<p>(ii) The lower limit of the median class is</p> <p>a) 40            (b) 10            (c) 30            (d) 20</p>	1												
	<p>(iii) The cumulative frequency of the class 30-40 is</p> <p>a) 40            (b) 20            (c) 30            (d) 41</p>	1												
	<p>(iv) The upper limit of the modal class is</p> <p>a) 20            (b) 30            (c) 10            (d) 20</p>	1												
	<p>(v) The construction of cumulative frequency table is useful in determining the</p> <p>a) mean            b) median            c) mode            d) all of these above</p>	1												
19	<p>If the radii of the two concentric circles with Centre O are 7 cm and 14 cm respectively and angle <math>\angle AOC = 40^\circ</math>, where AC is a chord of the outer circle.</p>													
	<p>(i) Area of inner circle is</p> <p>(a) <math>150 \text{ cm}^2</math>            (b) <math>154 \text{ cm}^2</math>            (b) <math>145 \text{ cm}^2</math>            (d) <math>300 \text{ cm}^2</math></p>	1												



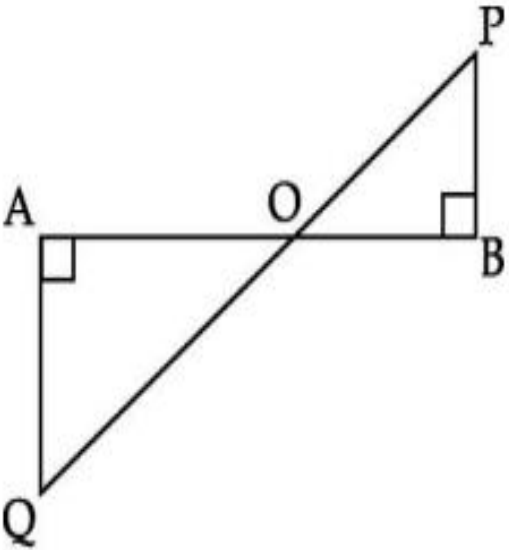
	(ii) Area of outer circle is (a) $616 \text{ cm}^2$ (b) $641 \text{ cm}^2$ (c) $465 \text{ cm}^2$ (d) $600 \text{ cm}^2$	1
	(iii) Area of sector AOC is (a) $\frac{616}{9}$ (b) $\frac{614}{9}$ (c) $\frac{626}{9}$ (d) $\frac{606}{9}$	1
	(iv) Area between two concentric circles is (a) $462 \text{ cm}^2$ (b) $362 \text{ cm}^2$ (c) $262 \text{ cm}^2$ (d) $762 \text{ cm}^2$	1
	(v) Length of outer circular boundary is (a) 88      (b) 78      (c) 68      (d) 58	1
20	(i) Two points on a Cartesian plane are (6,5) and (2,2) . Find the distance between the two points. (a) $\sqrt{25}$ units      (b) $\sqrt{7}$ units (c) $\sqrt{15}$ units      (d) $\sqrt{113}$ units	1
	(ii) Find the midpoint of the line segment joining (6,5) and (2,2) . (a) ( 4 , 3.5)      (b) ( 2 , 3.5) (c) ( 3 , 4 )      (d) ( 3.5 , 2)	1
	(iii) Find the point which equidistant to the given points on x axis. (a) ( $23/4$ , 0)      (b) ( $43/6$ , 0) (c) ( $53/8$ , 0)      (d) none of these	1
	(iv) Find the point which equidistant to the given points on y axis. (a) ( 0 , $53/6$ )      (b) ( 0 , $43/8$ ) (c) ( 0 , $63/5$ )      (d) ( 0 , $12/7$ )	1
	(v) Find the division point of the line segment in the ratio 2 : 3 (a) ( $14/5$ , $11/5$ )      (b) ( $22/5$ , $19/5$ ) (c) ( $6/5$ , $4/5$ )      (d) ( $18/5$ , $16/5$ )	1



	Part – B	
	Section – III	Marks
	All questions are compulsory. Contains 6 questions. Each question carries 2 marks. In case of internal choices attempt anyone.	
21	Three persons start their morning walk from the same line at the same time and in the same direction. Their steps measure 90cm 80cm and 85 cm. At what distance from the starting line will they be in the same line again ?	2
22	Find a relation between x and y such that the point P(x, y) is equidistant from the points A (3, 6) and B (-3, 5). (OR) Let P and Q be the points of trisection of the line segment joining the points A (2, -2) and B (-7, 4) such that P is nearer to A. Find the coordinates of P and Q	2
23	Draw a circle of radius 4 cm, with centre as O. Take a point P outside the circle at a distance of 6cm from O. Construct a pair of tangents to the circle from the point P .	2
24	Prove that $\frac{\sin A + \cos A}{\cos A - \sin A} + \frac{\cos A - \sin A}{\sin A + \cos A} = \frac{2}{\cos^2 A - \sin^2 A}$ (OR) Prove that $\frac{\cos^2 \theta}{\cot^2 \theta - \cos^2 \theta} = \tan^2 \theta$	2
25	In figure, AB and CD are common tangents to two circles of unequal radii. Prove that AB=CD. 	2





26	<p>In the given figure, <math>QA \perp AB</math> and <math>PB \perp AB</math>. If <math>AO = 20</math> cm, <math>BO = 12</math> cm, <math>PB = 18</math> cm, find <math>AQ</math></p> 	2
Sr. No.	<p style="text-align: center;"><b>Section – IV</b></p> <p>All questions are compulsory.</p> <p>In case of internal choices attempt any one</p>	Marks
27	<p>Prove that <math>2 - \sqrt{3}</math> is irrational.</p>	3
28	<p>The 19<sup>th</sup> term of an AP is equal to three times its 6<sup>th</sup> term. If its 9<sup>th</sup> term is 19, find the A.P.</p> <p style="text-align: center;">(OR)</p> <p>The sum of the first seven terms of an AP is 182. If its 4<sup>th</sup> and the 17<sup>th</sup> terms are in the ratio 1:5, find the AP.</p>	3



29	<p>In a quadrilateral ABCD, <math>\angle B = 90^\circ</math>. If <math>AD^2 = AB^2 + BC^2 + CD^2</math>, Prove that <math>\angle ACD = 90^\circ</math>.</p> <p>(OR)</p> <p>State and prove Pythagoras Theorem.</p>	3														
30	<p>The mean of following frequency distribution is 55.</p> <table><tr><th>Class Interval</th><th>Frequency</th></tr><tr><td>0 -20</td><td><math>x</math></td></tr><tr><td>20-40</td><td><math>y</math></td></tr><tr><td>40-60</td><td>9</td></tr><tr><td>60-80</td><td>6</td></tr><tr><td>80-100</td><td>4</td></tr><tr><td>Total</td><td>24</td></tr></table> <p>If the total number of observations is 24, find the missing frequencies <math>x</math> and <math>y</math>.</p>	Class Interval	Frequency	0 -20	$x$	20-40	$y$	40-60	9	60-80	6	80-100	4	Total	24	3
Class Interval	Frequency															
0 -20	$x$															
20-40	$y$															
40-60	9															
60-80	6															
80-100	4															
Total	24															
31	<p>Solve the simultaneous system of linear equations to get the values of <math>x</math> and <math>y</math> :</p> $\frac{x+1}{2} + \frac{y-1}{3} = 8$ $\frac{x-1}{3} + \frac{y+1}{2} = 9$	3														
32	<p>Solve for <math>x</math> :</p> $\frac{3}{x+1} + \frac{4}{x-1} = \frac{29}{4x-1}$	3														
33	<p>Show that the points <math>(a, a)</math>, <math>(-a, -a)</math> and <math>(-\sqrt{3}a, \sqrt{3}a)</math> are the vertices of an equilateral triangle.</p>	3														



Sr. No.	Section – V	Marks												
	All questions are compulsory. In case of internal choices attempt anyone.													
34	Find the mode of the following data <table><tr><td>Class</td><td>1-3</td><td>3-5</td><td>5-7</td><td>7-9</td><td>9-11</td></tr><tr><td>Frequency</td><td>7</td><td>8</td><td>2</td><td>2</td><td>1</td></tr></table>	Class	1-3	3-5	5-7	7-9	9-11	Frequency	7	8	2	2	1	5
Class	1-3	3-5	5-7	7-9	9-11									
Frequency	7	8	2	2	1									
35	<p>The angles of elevation and depression of the top and bottom of a lighthouse from the top of a 60 m high building are <math>30^\circ</math> and <math>60^\circ</math> respectively. Find</p> <p>(a) the distance between the lighthouse and the building.</p> <p>(b) the difference between the heights of the lighthouse and the building.</p> <p>(OR)</p> <p>A boat goes 16 km upstream and 24 km downstream in 6 hours. Also it covers 12 km upstream and 36 km downstream in the same time. Find the speed of the boat in still water and that of the stream.</p>	<p>3</p> <p>2</p> <p>5</p>												
36	A tent is in the shape of cylinder surmounted by a conical top of same diameter. If the height and diameter of cylindrical part are 2.1 m and 3 m respectively and the slant height of conical part is 2.8 m, find the cost of canvas needed to make the tent, if the canvas is available at the rate of ₹.500 per square meter. Use $\pi = 22/7$ .	5												

\*\*\*End of Paper\*\*\*